

Infectious Disease Serology

(615) 262-6374

Introduction

Diagnostic and immune status serologic assays are performed for various viral, rickettsial, bacterial, fungal, chlamydial, and mycoplasmal agents. The assay methods vary depending upon the specific agent for which testing is requested. For specific agents and assay methods refer to Chart V - 1 SEROLOGICAL TESTS AVAILABLE FROM TDH LABORATORY.

Serological testing for infectious agents that are not performed by the Tennessee Department of Health (TDH) Laboratory may be available at the Centers for Disease Control and Prevention (CDC). Consult with the appropriate section at the Nashville laboratory before submitting specimens for testing. According to CDC's guidelines, all specimens submitted to the CDC must come through the state laboratory or receive the state laboratory's approval for direct shipment from the provider to the CDC.

Specimen Acceptance Policy

HIV-1 -- Serological testing for HIV-1 is available only in support of counseling and testing sites established by the TDH Sexually Transmitted Diseases/HIV (STD/HIV) Control Program.

Other agents -- serological testing is available to all public and private health care providers.

Type of Specimen Required

Immunity Screening -- Immunity screening for rubella is intended for prenatal and family planning patients. Immunity screening for measles and mumps is not routinely available. Arrangements may be made with the TDH Laboratory to perform this screening on a case-by-case basis. A single, whole clotted blood or serum is required for rubella, measles, or mumps immunity screening.

Diagnostic Testing -- As a rule, acute and convalescent sera must be submitted for serological testing. The acute serum should be collected as soon after the onset of illness as possible. For the majority of the serological testing offered by the TDH Laboratory, the convalescent serum should be collected 14 days from the time the acute specimen was collected. In most cases, the laboratory requests that the acute and convalescent sera be submitted at the same time. For those agents for which IgM is available, submit the acute specimen when it is collected. See Chart V - 1 SEROLOGICAL TESTS AVAILABLE FROM THE TDH LABORATORY.

Infectious Disease Serology (Continued)

Chart V - 1
Serological Tests Available from the TDH Laboratory

Testing for infectious agents not listed in this chart may be available at the CDC.

Consult with the TDH Laboratory concerning testing not listed.

Agent or Disease Suspected	Specimen Needed	Test Method	Normal Reference Range ¹	Turn Around Time (days) ²
Eastern Equine encephalitis virus	Acute and convalescent (14 days) sera	IFA IgG IFA IgM	<1:20 <1:20	5 5
<i>Ehrlichia chaffeensis</i>	Acute and convalescent (28 days) sera	IFA, IgG	<1:128	5
Human immunodeficiency virus Type 1 (HIV-1) ³	Whole, clotted blood or serum	Screening - EIA Confirmation - WB	Non-Reactive Non-Reactive	7 7
LaCrosse (California encephalitis group) virus	Acute and convalescent (14 days) sera	IFA IgG IFA IgM	<1:20 <1:20	5 5
<i>Legionella pneumoniae</i> (Type 1-specific)	Acute and convalescent (28 days) sera	IFA, IgG	<1:128	5
Measles virus ⁴ (Rubeola)	Immunity Screening -- Whole clotted blood or serum	EIA (IgG)	Positive (Immune)	5
Measles virus (Rubeola) ⁴	Diagnostic -- Acute and convalescent (14 days) sera	EIA (IgG) EIA (IgM)	Negative Negative	1 1
Mumps virus ⁴	Immunity Screening -- Whole clotted blood or serum	EIA (IgG)	Positive (Immune)	5
Mumps virus	Diagnostic -- Acute and convalescent (14 days) sera	EIA (IgG)	Negative	1
<i>Mycoplasma pneumoniae</i>	Acute and convalescent (14 days) sera	EIA IgM EIA IgG	Negative Negative	5 5
Q Fever (<i>Coxiella burnetii</i>) Phases 1 and 2	Acute and convalescent (28 days) sera	IFA, IgG	<1:256	5
Rocky Mountain Spotted Fever (<i>Rickettsia rickettsii</i>)	Acute and convalescent (28 days) sera	IFA, IGG	<1:128	5
Rubella virus	Immunity Screening -- Whole clotted blood or serum	EIA (IgG)	Positive (Immune)	5

Infectious Disease Serology (Continued)

Chart V - 1 (continued)
Serological Tests Available from the TDH Laboratory

Agent or Disease Suspected	Specimen Needed	Test Method	Normal Reference Range ¹	Turn Around Time (days) ²
SARS ⁴ (COV)	Acute and convalescent (>28 days) sera	EIA	Negative	5
St. Louis encephalitis virus	Acute and convalescent (14 days) sera	IFA IgG IFA IgM	<1:20 <1:20	5 5
Typhus (<i>Rickettsia typhi</i>)	Acute and convalescent (28 days) sera	IFA, IgG	<1:128	5
West Nile Virus ⁴ (WNV)	Acute and convalescent (14 days) sera or CSF	EIA IgG EIA IgM	Negative Negative	5 5
Western Equine encephalitis virus	Acute and convalescent (14 days) sera	IFA IgG IFA IgM	<1:20 <1:20	5 5

Abbreviations

EIA	Enzyme Immunoassay	IgG G	Class Immunoglobulin
WB	Western Blot	IgM M	Class Immunoglobulin
IFA	Indirect Fluorescent Antibody	Quant	Quantitation, Quantitated

¹The normal reference range as stated in this table is for a single serum.

²Turn-around time is the number of working days from receipt of the specimen by the testing laboratory until the laboratory sends a report of test results.

³An EIA procedure is performed at the Knoxville, Jackson, and Nashville laboratories to screen serum specimens for antibody to HIV-1. The WB procedure is performed at the Nashville laboratory as a confirmatory test for those specimens found repeatedly reactive for HIV-I antibody by the EIA procedure. The Knoxville and Jackson laboratories forward specimens for the WB procedure to the Nashville laboratory. Testing is available only to the TDH STD/HIV Control Program's counseling and testing sites.

⁴Prior approval required before specimen submission.

Infectious Disease Serology (Continued)

Specimen Collection

Blood

1. Collect an acute serum as soon after the onset of the illness as possible. A convalescent serum should be collected 14 days after the collection of the acute serum. Exceptions to this general rule of collection of specimens are noted in Chart V - 1 SEROLOGICAL TESTS AVAILABLE FROM TDH LABORATORY
2. Draw at least 5 to 7 ml of blood into a red-stoppered vacuum tube allowing the tube to fill completely. Allow the tube to stand at room temperature to ensure complete clotting of blood. Blood should not be taken for 1 hour after a meal to avoid chylous serum.
3. Store the specimen in a refrigerator until it is sent to the laboratory. If a sample of serum is to be sent to the laboratory, separate the serum from the blood clot by centrifuging the whole clotted blood at 1,500 to 2,000 rpm at room temperature for 10 minutes. Pipette the serum into a new red-stoppered vacuum tube or a sterile plastic screw-capped vial. **A minimum of 1 ml of serum should be sent to the laboratory for testing.**

Serum-separating tubes may be used to collect the specimens for serological testing. These specimens should be sent to arrive in the testing laboratory within 48 to 72 hours of collection to avoid having the red blood cells hemolyze and "spill" into the upper portion of the tube.

4. Acute serum that is held until the collection of a convalescent serum should be separated from the blood clot and stored frozen until collection of the convalescent serum. Acute serum will not be tested routinely unless the TDH Laboratory offers testing for the IgM class of antibody for the analytic testing requested. Convalescent specimens may be run as stand alone specimens in limited situations. Consultation with the supervisor of the Serology Unit is required before the convalescent serum will be tested singly.

Spinal Fluid

Prior arrangement must be made with the TDH Laboratory before cerebrospinal fluid (CSF) specimens are submitted for serologic testing. The VDRL test for syphilis is routinely performed on CSF. The EIA test for West Nile Virus (WNV) IgM is performed on CSF seasonally.

Specimen Identification

1. Use the appropriate form for the test requested:

Rubella	Rubella Form PH-1917
HIV-1	HIV-1 Serology Form PH-3173
Other non-syphilis serologies	Immunoserology Form PH-1589

Complete all the information on the form. Include pertinent clinical information with each specimen. Be specific about why the specimen is being submitted to the laboratory.

For rubella, measles (rubeola), and mumps, indicate whether the specimen is for diagnosis of a current infection or for immunity screening and if the patient is a prenatal or family planning patient.

For HIV-1 serological testing, include the information as prescribed by the TDH STD/HIV Control Program.

Infectious Disease Serology (Continued)

2. Using indelible ink, label each specimen with the patient's first and last name and the date of collection. Attach the tear strip number from the form to the specimen, and secure it with transparent tape. Unlabeled specimens or specimens containing information that does not exactly match the information on the accompanying test request form **will not be tested**.

Shipment of Specimens

1. Packing and shipping specimens to the state public health laboratory requires personnel trained in current regulations. Follow the shipping guidelines of your current carrier or shipping method.
2. Affix the mailing label (PH-0838), return address, and infectious substance (etiologic agent) or clinical (diagnostic) specimen label to the outer container.
3. Ship to the Tennessee Department of Health Laboratory Services.
4. Use first-class postage on US mail.

Reporting Procedure and Interpretation

An interpretation of the results is given with each report. **For specimens sent to the CDC, the CDC will provide interpretation of test results.**

Final Reporting

The results of all specimen requests are reported to the provider who submitted the specimen.

If the result of the specimen is positive for a notifiable disease, this result is also reported to the TDH Communicable and Environmental Disease Services and to the health department in the patient's county of residence.


Criteria for Unacceptable Specimens

1. The specimen is not properly identified with the patient's name and the date of collection.
2. The patient identifier on the specimen does not exactly match the identifier on the form.
3. The specimen is broken or leaked in transit.
4. The specimen is extensively hemolyzed, lipemic (chylous), extremely turbid, or grossly contaminated with bacteria.
5. Whole, clotted blood was collected more than 7 days prior to receipt by the laboratory and serum not separated from the clot.
6. The quantity of the specimen received is not sufficient to allow accurate completion of test(s) requested. (QNS-Quantity Not Sufficient).
7. An acute serum specimen was submitted a month ago. A convalescent serum specimen has not been received.
8. The convalescent serum was collected sooner than 10 days from the date of collection of the acute serum. (The provider will be notified and asked to provide a more appropriately timed convalescent serum.)
9. No test request form was received with the specimen or no specimen was received with a test request form.

Infectious Disease Serology (Continued)

Rubella Form PH-1917

FRONT

SOCIAL SECURITY NO.		TENCARE NO.		MCO		RUBELLA SEROLOGY		A305239																															
MEDICARE NO.				RECORD FOLDER NO.		DATE REPORTED		DATE/TIME RECEIVED																															
PATIENTS NAME - LAST, FIRST, MIDDLE				SPOUSE - FIRST NAME		▼ LAB NO. ▼																																	
STREET AND NUMBER																																							
TOWN				STATE		ZIP																																	
DATE OF BIRTH		RACE	ETHNICITY	SEX	PHONE NO.																																		
COUNTY NO.		COUNTY NAME				SITE NO.																																	
<div style="display: flex;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); border: 1px solid black; padding: 2px;">REPORT TO</div> <div> <table border="1"> <tr><td colspan="10">NAME</td></tr> <tr><td colspan="10">ADDRESS</td></tr> <tr><td colspan="4">CITY</td><td colspan="2">STATE</td><td colspan="4">ZIP CODE</td></tr> </table> </div> </div>										NAME										ADDRESS										CITY				STATE		ZIP CODE			
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PH-1917 REV. 12-96		 TENNESSEE DEPT. OF HEALTH LABORATORY SERVICES 630 HART LANE • NASHVILLE, TN MICHAEL W. KIMBERLY, DR. P.H., DIRECTOR				NASHVILLE CENTRAL LABORATORY																																	
PURPOSE OF SPECIMEN <input type="checkbox"/> IMMUNITY SCREENING * (Date of Collection ____/____/____) <input type="checkbox"/> FAMILY PLANNING <input type="checkbox"/> PRENATAL <input type="checkbox"/> EXPOSURE/DIAGNOSIS * (Date of Exposure ____/____/____) DATE OF ONSET OF ILLNESS DATE OF COLLECTION ACUTE CONVALESCENT																																							
CLINICAL INFORMATION EXAMINATION RESULTS * (*SEE REVERSE SIDE) <input type="checkbox"/> IMMUNITY <input type="checkbox"/> NO IMMUNITY <input type="checkbox"/> EQUIVOCAL (SEE REVERSE SIDE) <input type="checkbox"/> EXPOSURE/DIAGNOSIS - REPORT OF RESULTS IN LETTER FORM <input type="checkbox"/> UNSATISFACTORY																																							
EXAMINED BY:								RDA-1160																															

BACK

ENZYME IMMUNOASSAY (EIA) TEST FOR RUBELLA ANTIBODY	
IMMUNITY SCREENING - single serum tested and reported as immunity, no immunity, or equivocal based on the following criteria:	
NO IMMUNITY - Immune Status Ratio (ISR) less than or equal to 0.90 * EQUIVOCAL - Immune Status Ration (ISR) greater than 0.90 but less than 1.10 IMMUNITY - Immune Status Ratio (ISR) greater than or equal to 1.10	
* Serum, producing equivocal results for 2 or the 3 tests performed on it, are reported as equivocal. Another serum should be submitted for testing with the method performed by Laboratory Services, of the new specimen may be submitted to another laboratory offering different test methodology.	
EXPOSURE/DIAGNOSIS Report of test results and interpretation of results are submitted to provider of specimen in letter form and are not reported via this form.	

Infectious Disease Serology (Continued)

HIV-1 Serology Form PH-3173

FRONT

SOCIAL SECURITY NO.		TENN CARE NO.		MCO		HIV-1 SEROLOGY		B753125	
MEDICARE NO.				RECORD FOLDER NO.				DATE REPORTED	
PATIENTS NAME - LAST, FIRST, MIDDLE				SPOUSE - FIRST NAME				LAB RECEIPT DATE/TIME	
STREET AND NUMBER				TOWN				SPECIMEN CONTROL NO. LAB NO.	
STATE		ZIP		TYPE OF SPECIMEN: <input type="checkbox"/> SERUM <input type="checkbox"/> PLASMA				RISK FACTOR(S):	
DATE OF BIRTH		RACE		ETHNICITY		SEX		PHONE NO.	
COUNTY NO.		COUNTY NAME		SITE NO.		DATE OF PREVIOUS TEST:			
NAME		ADDRESS		CITY		STATE		ZIP CODE	
PH-3173 REV 10/02		Tennessee Dept. of Health LABORATORY SERVICES MICHAEL W. KIMBERLY, DR. P.H., DIRECTOR		<input type="checkbox"/> K <input type="checkbox"/> J <input type="checkbox"/> N		LABORATORY PERFORMING EXAMINATION		EXAMINED BY:	
DO NOT DETACH		HIV-1 SEROLOGY		PLEASE FILL OUT SHADED AREA COMPLETELY		Tennessee Dept. of Health - Laboratory Service		RDA-1160	

BACK

HIV-1 SEROLOGY	
Serum or plasma are the only acceptable specimens for testing for HIV-1 antibody.	
Persons with indeterminant HIV-1 antibody results should be retested in one to six months.	
Interpretation of test results are based on package insert instructions for the commercial EIA procedure used and on current ASTPHLD/CDC recommendations for the Western Blot procedure.	
EIA = Enzyme Immunoassay (Screening Test) Western Blot (Supplementary Test)	
TESTING LABORATORY LOCATION CODES	
J	= JACKSON BRANCH LAB, 295 SUMMAR DRIVE, JACKSON, TN - DR. JOHN R. HITZ, DIRECTOR
K	= KNOXVILLE BRANCH LAB, 1522 CHEROKEE TRAIL, KNOXVILLE, TN - DR. PHILIP M. BAKER, DIRECTOR
N	= NASHVILLE REFERENCE LAB, 630 HART LANE, NASHVILLE, TN - DR. MICHAEL W. KIMBERLY, DIRECTOR

NOTE: Use the Laboratory Location Codes listed below. New forms are currently undergoing revision.

TESTING LABORATORY LOCATION CODES
J = JACKSON BRANCH LAB, 295 SUMMAR DRIVE, P.O. BOX 849, JACKSON, TN 38302-0849 - MICHAEL W. KIMBERLY, DIRECTOR
K = KNOXVILLE BRANCH LAB, 1522 CHEROKEE TRAIL, P.O. BOX 59019, 37950-9019, KNOXVILLE, TN - MICHAEL W. KIMBERLY, DIRECTOR
N = NASHVILLE REFERENCE LAB, 630 HART LANE, NASHVILLE, TN 37247-0801 - DR MICHAEL W. KIMBERLY, DIRECTOR

Infectious Disease Serology (Continued)

Immunoserology Form PH-1589

FRONT

SOCIAL SECURITY NO. _____ **TENNCARE NO.** _____ **MCO** _____

MEDICARE NO. _____ **RECORD FOLDER NO.** _____

PATIENTS NAME - LAST, FIRST, MIDDLE _____ **SPOUSE - FIRST NAME** _____

STREET AND NUMBER _____

TOWN _____ **STATE** _____ **ZIP** _____

DATE OF BIRTH _____ **RACE** _____ **ETHNICITY** _____ **SEX** _____ **PHONE NO.** _____


COUNTY NO. _____ **COUNTY NAME** _____ **SITE NO.** _____

NAME _____

ADDRESS _____

CITY _____ **STATE** _____ **ZIP CODE** _____

PH-1589
REV 2-96


**TENNESSEE DEPT. OF HEALTH
LABORATORY SERVICES**
 550 HART LANE
 NASHVILLE, TN
 MICHAEL W. KIMBERLY, DR. P.H. DIRECTOR

**NASHVILLE CENTRAL
LABORATORY**

IMMUNOSEROLOGY B124543

DATE REPORTED _____ **LAB RECEIPT DATE/TIME** _____ **SPECIMEN CONTROL NO.** _____

DATE OF ONSET _____ **DATE OF COLLECTION:** _____ **CONVALESCENT** _____

TYPE OF SPECIMEN: ☐ SERUM ☐ CSF*

DISEASE SUSPECTED: _____

CLINICAL INFORMATION _____

EXAMINATION RESULTS								*SEE REVERSE SIDE	
TEST NO.*	ACUTE TITER	CONVALESCENT TITER	EXPLANATION*	TEST USED*	TEST NO.*	ACUTE TITER	CONVALESCENT TITER	EXPLANATION*	TEST USED*

☐ UNSATISFACTORY
☐ SUBMITTED TO REFERENCE LABORATORY FOR EXAMINATION RESULTS FORTHCOMING.

EXAMINED BY: _____ **RNA-1160**

BACK

TEST NUMBERS			EXPLANATIONS
RESPIRATORY	CNS	MISCELLANEOUS	
1 INFLUENZA A	21 MUMPS	41 SPOTTED FEVER GROUP	A NO SEROLOGIC EVIDENCE OF INFECTION
2 INFLUENZA B	22 HERPES SIMPLEX	42 TYPHUS FEVER GROUP	B RESULTS COMPATIBLE WITH CURRENT INFECTION
3 ADENOVIRUS	23 EAST EQUINE ENCEPHALO	43 Q FEVER (PHASE 1)	C RESULTS COMPATIBLE WITH INFECTION AT UNDETERMINED TIME BUT NOT NECESSARILY RELATED TO THE PRESENT ILLNESS
4 RESPIRATORY SYNCYTIAL	24 WEST EQUINE ENCEPHALO	44 Q FEVER (PHASE 2)	D ANOTHER SERUM IS REQUESTED
5 PARA INFLUENZA 1	25 ST. LOUIS ENCEPHALITIS	45 RUBEOLA (Red Measles)	E OTHER _____
6 PARA INFLUENZA 2	26 CALIF. ENCEPHALITIS	46	
7 PARA INFLUENZA 3	27	47	
8 M PNEUMONIAE	28	48 PSITTACOSIS - LGV GROUP	
9 HISTOPLASMOSIS (MYCELIAL PHASE)	29	49 LEGIONNAIRES'S DISEASE	
10 HISTOPLASMOSIS (YEAST PHASE)	30	50 EHRLICHIOSIS (MONOCYTIC)	
11 BLASTOMYCOSIS	31	51	
12	32	52	
13	33	53	
14	34	54	
15	35	55	
16	36	56	
17	37	57	
18	38	58	
19	39	59	
20	40	60	

PRIOR ARRANGEMENT MUST BE MADE WITH THE STATE REFERENCE LABORATORY BEFORE CEREBROSPINAL FLUID (CSF) SPECIMENS ARE SUBMITTED FOR SEROLOGIC TESTING.

TEST USED	
CF	COMPLEMENT FIXATION
HI	HEMAGGLUTINATION - INHIBITION
AGG	AGGLUTINATION
IFA	INDIRECT FLUORESCENT ANTIBODY
EIA	ENZYME IMMUNOASSAY